broad white rings on the tarsi, involving both ends of the joints, the last tarsal joint wholly white. Wings with brownish scales on the veins, not very dense.

One ♀, Bluefields, Nicaragua (W. F. Thornton).

*Type.*—Cat. No. 10260, U. S. Nat. Mus.

**Tæniorhynchus coticula, new species.**

Proboscis brown, blackish outwardly, a white ring in the middle, the tip also white; palpi black, whitish at the end; thorax light brown, the impressed lines pale, the ridges dark, forming a series of narrow dark lines; abdomen black above with a slight bluish luster, unbanded, below with a sublateral row of small segmentary silvery spots; legs black, the hind femur with a spot at outer third and tip of bluish silvery white, the hind tarsal joints broadly white ringed at the base, the last joint all white.

Two ♀♀, Bocas del Toro, Panama, Sept. 25, 1903 (P. Osterhaut).

*Type.*—Cat. No. 10281, U. S. Nat. Mus.

## Class I, HEXAPODA.

### Order V, LEPIDOPTERA.

## PHILOSAMIA CYNTHIA AND CALLOSAMIA PROMETHIA CROSSES.

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It may be of interest to supplement Miss Soule's notes on *cynthia* and *promethia** crosses with my experiences last summer when I was so fortunate as to get some hybrid larvæ that differed from both parents.

Having had crosses a number of times for several years between *cynthia* ♀ and *promethia* ♂ without being able, for some unknown cause to raise the resulting larvæ to maturity, I determined, as Mr. F. E. Watson was kind enough to again supply me with cocoons of both species, to try this past summer what could be accomplished with care

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in crossing the two species. With a stock of two thousand cocoons and the aid of my sister I thought some results could be had.

From the start we found that there was a great difference in the desire to mate in the two species and also in individuals of the same species. The *promethia* ♂ was generally quite willing and even anxious to take a *cynthia* ♀ for wife but she was so averse to a mixed marriage, that the attempt, although persisted in by the *promethia* ♂, was usually a failure and the eggs infertile. It was interesting to watch the *cynthia* ♀ attempt to get rid of the *promethia*, by contracting the abdomen, more especially the tip which was entirely retracted and the body was meanwhile turned from side to side until the claspers of the *promethia* slipped off. The *promethia* would try it again and again with the same result, and it was only in a few cases that the attempt was successful and the eggs fertile. In a number of cases the mating was evidently successful but the *cynthia* would refuse to lay eggs and hang to the bag with her abdomen retracted to its smallest compass until death, unless a *cynthia* ♂ was introduced when mating readily took place and egg laying would begin.

In my experience I have never found *cynthia* ♀ willing to mate with two males so that remating with *cynthia* after *promethia* is interesting.

In these two crosses the eggs were typical *cynthia* and the larvæ, as Miss Soule states, were also *cynthia* except that mine seemed to have a tendency to yellowish cream color; but this may have been due to rearing in jars.

The silk made by these larvæ was typical *cynthia* silk. The cocoons of the singly mated ones were rather smaller than normal *cynthia* but the cocoons of the twice mated females were about normal in size to *cynthia*. Both, to me, presented the appearance and shape of true *cynthia* cocoons in all particulars, and the larvæ had the same habit of spinning a long stem, often a foot long, where occasion required it. The opening of the cocoon was also arranged and had the appearance, as in *cynthia*. Should my lot of cocoons of these two crosses be mixed with true *cynthia* ones I doubt if any one could separate them. This difference from the observations of Miss Soule may be accounted for by their feeding on *Ailanthus*.

The real interest in the series of crosses came from some matings of *promethia* ♀ with *cynthia* ♂. In these crosses we had the same difficulty of the female not laying until remated with a male of her

species to a greater degree, and there was not that desire to mate in the male as there was in the opposite cross, while the female had the same repugnance to the *cynthia* ♂ as there was in the reverse case, so that these matings were few.

The eggs resulting from these crosses were not to be distinguished from normal *promethia* eggs. The eggs of the single matings gave larvæ, a few of which were not to be distinguished from normal *promethia*, but most of them had heavy black bands on the segments, a few being nearly all black. At the first moult we were agreeably surprised to see the fine cream-colored *cynthia*-like larvæ that crawled out of the first stage *promethia* skins. So astonished were we that had we not seen them we would have supposed that *cynthia* larvæ had got in the jar by accident. In the next stages the dual parentage of the larvæ was very evident. Colored figures of these stages I hope to publish later with the figures of the resulting moths.

The cocoons of these were very small and were either spun between two leaves or in the folded corner of one; the tendency to stem-making was partly lost, some few not making any at all, others spinning a layer of silk to the leaf stem. In this lot several crawled out of the cocoons when nearly completed, but we did not have this happen in the crosses that had *cynthia* females.

The sum of the results of crossing these species both ways shows that it is the *cynthia* which has the greater effect on the resulting hybrid larvæ and it remains to be seen what the results will be in the imago.

The cocoons show less specialization than any of the parents, but have the *cynthia* characters predominating.

Miss Soule gives a wrong interpretation of the pulling in of the loose threads at the opening of the cocoon. What I have observed is that the larva takes a bunch of threads in its mandibles and pulls these threads in by suddenly retracting the head and front segments, *meanwhile holding on by its "props"* to the bottom or side of the cocoon.

Since writing the above Miss Soule has informed me that she had also given some notes on these hybrids in *Psyche* for November, 1902. My results, however, were different from hers in that all my larvæ of *cynthia* ♂ and *promethia* ♀ were of the same type, and only differed slightly in color, though a larger amount of material might have shown different results. The bifid horn on the eleventh segment she mentions is also occasionally bifid in pure *promethia*.